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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/652,255
Filing Date: August 29, 2003
Appellant(s): BASU ET AL.

Edward A. Gordon
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 11/10/2008 appealing from the Office action mailed 04/09/2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct. However, said Claims Appendix is identified merely as "APPENDIX" rather than "CLAIMS APPENDIX".

(8) Evidence Relied Upon

US 2001/0040895 A1	TEMPLIN	11-2001
6,362,821	GIBSON	3-2002
5,960,047	PROCTOR	9-1999

N. Garg, V. Santosh, A. Singla. "Improved approximation algorithms for biconnected subgraphs via better lower bounding techniques". Symposium on Discrete Algorithms: Proceedings of the fourth annual ACM-SIAM Symposium on Discrete algorithms. Austin, Texas, United States (1993), pp. 103 - 111.

Q. Li and D. Rus. Sending Messages to Mobile Users in Disconnected Ad-hoc Wireless Networks. MOBICOM 2000. August 2000.

E. Jennings and C. Okino. Topology Control for Efficient Information Dissemination in Ad-hoc Networks. Internations Symposium on Performance Evaluation of Computer and Telecommunicaion Systems .SPECTS. 2002.

W. Liao, Y. Tseng and J. Sheu. GRID: A Fully Location-Aware Routing Protocol for Mobile As Hoc Networks. Telecommunication Systems, 18(1), (2001), pp. 37 - 60.

T. Hsu. Simpler and faster biconnectivity augmentation. Journal of Algorithms 45 (2002) pp. 55 - 71.

C. Lin and M. Gerla. Adaptive Clustering for Wireless Networks. IEEE Journal on Selected Areas in Communications, Vol. 15, No. 7, September 1997.

D. Mount. CMSC 451: Lecture 11. Articulation Points and Biconnected Components. www.cs.umd.edu/~samir/451/bc.ps. pp. 1 - 5. October 6, 1998.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 38, 39 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garg et al. (Improved Approximation Algorithms for Biconnected Subgraphs via Better Lower Bounding Techniques), hereafter Garg, in view of Li et al. (Sending Messages to Mobile Users in Disconnected Ad-hoc Wireless Networks), hereafter Li.

2. Regarding claim 38, Garg shows a method for achieving biconnectivity in a network that includes a plurality of nodes (Garg, 1, 3.1-3.2) including generating a graph of the network (Garg, 3.1, 3.1.1) and identifying cutverticies in the network (Garg, 3.1.1, 3.1.2), as well as removing said cutverticies (3.1.1, and further where removing cutverticies to make a network biconnected is inherent, as biconnected networks inherently do not have cutverticies).

Garg does not show causing one or more of the nodes to move systemtically.

Li shows node movement in a network, and directing said node movement in order to improve network performance (Li, Section 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

3. Regarding claim 39, Garg shows achieving biconnectivity in a non-biconnected network that includes a plurality of nodes, as well as transforming a non-biconnected network to a biconnected network (Garg, 3.1-3.1.2, 4.1, 4.4).

Garg does not show identifying one or more of the nodes to move, determining direction and distance to move the one or more nodes; and moving the one or more nodes in the determined direction and distance.

Li shows identifying one or more of the nodes to move (Li, Section 1); determining direction and distance to move the one or more nodes; and moving the one or more nodes in the determined direction and distance (where Li shows changing a nodes trajectory (Section 1) along with how a node move and where a node moves to (Section 3.2), thus inherently showing 'a determined direction and distance').

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

4. Regarding claim 49, Garg shows achieving biconnectivity in a network that includes a plurality of nodes, determining the current topology of the network (3.1), instructions for indentifying cutverticies in the network based on the current topology of the network (3.1.1) and systematically removing cutverticies from the network and

forming a biconnecting network (Garg, Section 1, 3.1.1 and 3.1.2, where Mount on pg. 1 shows where a lack of cutverticies are inherent to a biconnected network).

Garg does not show instructions for identifying one or more of the nodes in the network to move.

Li shows means for causing each of one or more of the nodes to move, and directing said node movement in order to improve network performance (Li, Section 1). Furthermore, Li shows controlling node movement and trajectory, which inherently includes causing and controlling movement in a particular direction (Section 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

Garg in view of Li thus show claim 49.

5. Claims 1 – 7, 9 - 19, 21 – 28, 30 – 37, and 40 - 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over as being unpatentable over Garg in view of Li, further in view Templin (US 2001/0040895 A1).

6. Regarding claim 1, Garg shows method for achieving biconnectivity in a network that includes a plurality of nodes, the method comprising: forming blocks from groups of one or more of the nodes in the network; selecting one of the blocks as a root block;

identifying other ones of the blocks as leaf blocks; and modifying the edges to make the network biconnected (3.1, 4.1, 4.4).

Garg does not show collectivey moving the nodes in one or more of the leaf blocks to make the network biconnected.

Li shows moving nodes in an ad-hoc (MANET) environment in order to improve network communication, where the nodes are autonomous or semi-autonomous robotic nodes (Sections 1, 5), and further where when nodes maintain their neighbors, calculations are simplified (Section 5.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

Garg in view of Li do not show where the node movements are done collectively in blocks.

Templin shows where node movement should be minimized, as it results in increased transmissions and can temporarily diminish network performance ([0039]).

It would have been obvious to further modify disclosure of Grag in view of Li with that of Templin, and thus move nodes in collective group block movements, in order to minimize overall node movement and maintain nodes neighbors to the greatest

extent possible, thus decreasing transmission costs and improving network performance (Templin [0039]).

7. Regarding claim 2, Garg in view of Li and Templin further show wherein the forming blocks includes: generating a graph of a current view of a topology of the network (Li, Sections 5, 5.1), and generating a block tree based on the current view of the topology of the network, the block tree organizing the nodes into one or more blocks (Garg, 3.1.1, 4.4).

8. Regarding claim 3, Garg in view of Li and Templin further show where the generating a graph includes: determining locations of the nodes in the network, and determining the current view of the topology of the network based on the locations of the nodes in the network (Li, Sections 5, 5.1).

9. Regarding claim 4, Garg in view of Li and Templin further show where the determining locations of the nodes includes: periodically receiving updates from the nodes, each of the updates includes a location of a corresponding one of the nodes. (Li, Sections 5, 5.1).

10. Regarding claim 5, Garg in view of Li and Templin further show where the determining locations of the nodes further includes: extracting neighbor information from the updates (Li, Section 5, where Li discloses that if you directly receive an update from a node, it is a neighbor).

11. Regarding claim 6, Garg in view of Li and Templin further show identifying cutvertices in the network (Garg, 3.1.1).

12. Regarding claim 7, Garg in view of Li and Templin further show where the collectively moving one or more (Li, Section 1, where nodes are moved to improve network performance) of the leaf blocks includes: moving one or more of the leaf blocks to remove one or more of the cutvertices from the network (Garg, 3.1.1, 3.1.2, 4.4).

13. Regarding claim 9, the collectively moving the nodes in one or more of the leaf blocks includes: moving all of the nodes within one of the leaf blocks collectively when the leaf block is moved (Li, where the leaf blocks are moved collectively to minimize messaging and transmissions costs Templin, [0039], and further where the collective movement inherently results in not changing the connectivity within the leaf block) and to simplify calculations by maintaining nodes neighbors to the greatest extent possible (Li Section 5.1)).

14. Regarding claim 10, Garg in view of Li and Templin further show where the one or more of the leaf blocks are moved while minimizing a total distance moved by all of the nodes in the network (where Templin ([0039] shows minimizing node movement along with Li (Section 1)).

15. Regarding claim 11, Garg in view of Li and Templin further show where the collectively moving the one or more nodes in of the leaf blocks includes: moving one or more of the leaf blocks, as a particular leaf block, towards a nearest node in another one of the blocks (in order to create the biconnected network disclosed by Garg (3.1 – 3.1.2, 4.4) utilizing Templin's ([0039]) and Li's (Section 5.1) disclosures of minimizing node movement and keeping the changes of nodes neighbors minimized).

16. Regarding claim 12, Garg in view of Li and Templin further show where the particular leaf block is moved towards the nearest node until at least one new edge appears between the particular leaf block and the other one of the blocks (in order to create the biconnected network by creating/drawing edges disclosed by Garg (3.1 – 3.1.2, 4.4) utilizing Templin's ([0039]) and Li's (Section 5.1) disclosures of minimizing node movement and keeping the changes of nodes neighbors minimized).

17. Regarding claim 13, Garg in view of Li and Templin further show wherein the collectively moving (Li, Section 1, and Templin, [0039]) the nodes in one or more of the leaf blocks is performed iteratively (Garg, 3.1.1 and 3.1.2) until the network is biconnected (Garg, 1, 3.1.1).

18. Regarding claim 14, Garg in view of Li and Templin further show where the collectively moving the nodes in of one or more of the leaf blocks is performed after final positions for the one or more of the leaf blocks is determined (where Li discloses that maintaining the network structure simplifies calculations, Section 5.1).

19. Regarding claims 15 and 16, Garg in view of Li and Templin further show where the method is performed by one or more, or each of the nodes in the network (where Garg shows all nodes being considered (3.1) which enables creating the most reliable and fully optimized network).

20. Regarding claim 17, Garg in view of Li and Templin further show where the nodes are capable of moving on their own (Li, Section 1).

21. Regarding claims 18, Garg in view of Li and Templin further show where the nodes include robotic nodes (Li, Section 1).

22. Regarding claim 19, Garg shows a system for achieving biconnectivity in a network that includes a plurality of nodes comprising means for grouping the subsets of nodes into blocks and means for identifying the cutveritices in the network, and means for, over a number of iterations, removing the cutverticies from the network (3.1-3.1.2, 4.4).

Garg does not show collectively moving the subsets of nodes in or more blocks.

Li shows moving nodes in order to improve network communication, and further where when nodes maintain their neighbors, calculations are simplified (Section 5.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

Garg in view of Li do not show where the node movements are done collectively in blocks.

Templin shows where node movement should be minimized, as it results in increased transmissions and can temporarily diminish network performance ([0039]).

It would have been obvious to further modify disclosure of Grag in view of Li with that of Templin, and thus move nodes in collective group block movements, in order to minimize overall node movement and maintain nodes neighbors to the greatest extent

possible, thus decreasing transmission costs and improving network performance (Templin [0039]).

23. Regarding claim 21, Garg shows generate a current view of the network (Garg, 3.1.1, 4.4), forming blocks from groups of one or more of the nodes in the network based on the current view of the network (Garg, 3.1, 4.1, 4.4), as well as making a network biconnected (Garg, 3.1, 4.1, 4.4).

Garg does not show in a network that includes a plurality of nodes, at least one of the nodes comprising: a network device that is capable of moving within the network and a movement controller.

Li shows in a network that includes a plurality of nodes, at least one of the nodes comprising: a network device that is capable of moving within the network; and a movement controller (Li, Section 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

Garg in view of Li do not show where the node movements are done in blocks.

Templin shows where node movement should be minimized, as it results in increased transmissions and can temporarily diminish network performance ([0039])

It would have been obvious to further modify disclosure of Grag in view of Li with that of Templin, and thus move nodes in group block movements, in order to minimize overall node movement and maintain nodes neighbors to the greatest extent possible, thus decreasing transmission costs and improving network performance (Templin [0039]).

Garg in view of Li and Templin thus show identifying one or more of the blocks, as one or more identified blocks, to move (Li, Sections 1 and 5, Templin [0039]) to make the network biconnected (Garg, 3.1, 4.1, 4.4), as well as the entirety of claim 21 as outlined above.

24. Regarding claim 22, Garg in view of Li and Templin further show where the movement controller is further configured to instruct the network device to move to a particular location when the at least one node is one of the nodes in one of the one or more identified blocks (Li, Sections 1 and 5; Garg 3.1-3.1.2 and 4.4).

25. Regarding claim 23, Garg in view of Li and Templin further show all of the nodes within the one of the one or more identified blocks move collectively (Li, where the leaf blocks are moved collectively to minimize messaging and transmissions costs Templin ([0039]) and to simplify calculations by maintaining nodes neighbors to the greatest extent possible (Li Section 5.1)).

26. Regarding claim 24, Garg in view of Li and Templin further show where the generating a graph includes: determining locations of the nodes in the network, and determining the current view of the topology of the network based on the locations of the nodes in the network (Li, Sections 5, 5.1).

27. Regarding claim 25, Garg in view of Li and Templin further show where the determining locations of the nodes includes: periodically receiving updates from the nodes, each of the updates includes a location of a corresponding one of the nodes. (Li, Sections 5, 5.1).

28. Regarding claim 26, Garg in view of Li and Templin further show where the determining locations of the nodes further includes: extracting neighbor information from the updates (Li, Section 5, where Li discloses that if you directly receive an update from a node, it is a neighbor).

29. Regarding claim 27, Garg in view of Li and Templin further show identifying cutvertices in the network (Garg, 3.1.1).

30. Regarding claim 28, Garg in view of Li and Templin further show where when identifying one or more of the blocks to move, the movement controller is configured to identify a distance and direction to move the one or more identified blocks (Li, Section 1, where nodes are moved to improve network performance) so as to remove one or more of the cutvertices from the network (Garg, 3.1.1, 3.1.2, 4.4).

31. Regarding claim 30, Garg in view of Li and Templin further show where the movement controller is further configured to determine a distance and direction that the one or more identified blocks should move (Li, Section 1).

32. Regarding claim 31, Garg in view of Li and Templin further show where the one or more of the leaf blocks are moved while minimizing a total distance moved by all of the nodes in the network (where Templin ([0039] shows minimizing node movement along with Li (Section 1)).

33. Regarding claim 32, Garg in view of Li and Templin further show where the moving one or more of the leaf blocks includes: moving each of the one or more of the leaf blocks, as a particular leaf block, towards a nearest node in a parent block (in order to create the biconnected network disclosed by Garg (3.1 – 3.1.2, 4.4) utilizing Templin's ([0039]) and Li's (Section 5.1) disclosures of minimizing node movement and keeping the changes of nodes neighbors minimized).

34. Regarding claim 33, Garg in view of Li and Templin further show where the particular leaf block is moved towards the nearest node until at least one new edge appears between the particular leaf block and the parent block (in order to create the biconnected network by creating/drawing edges disclosed by Garg (3.1 – 3.1.2, 4.4) utilizing Templin's ([0039]) and Li's (Section 5.1) disclosures of minimizing node movement and keeping the changes of nodes neighbors minimized).

35. Regarding claim 34, Garg in view of Li and Templin further show wherein the moving (Li, Section 1, and Templin, [0039]) the one or more identified nodes in the leaf blocks is performed iteratively (Garg, 3.1.1 and 3.1.2) until the network is biconnected (Garg, 1, 3.1.1).

36. Regarding claims 35, Garg in view of Li and Templin further show where the moving of one or more of the leaf blocks is performed after final positions for the one or more of the leaf blocks is determined (where Li discloses that maintaining the network structure simplifies calculations, Section 5.1).

37. Regarding claim 36, Garg in view of Li and Templin further show where the at least one node includes all of the nodes in the network (Garg, 3.1 – 3.1.2).

38. Regarding claim 37, Garg in view of Li further show where the nodes include robotic nodes (Li, Section 1).

39. Regarding claim 40, Garg in view of Li show the disclosure of claim 39.

Garg in view of Li further show forming blocks from groups of at least one of the nodes in the non-biconnected network, selecting one of the blocks as a root block, and identifying other ones of the blocks as leaf blocks (Garg, 3.1, 4.1, 4.4), as well as showing moving nodes (Li, Section 1).

Garg in view of Li do not show moving the nodes as blocks.

Templin shows where node movement should be minimized, as it results in increased transmissions and can temporarily diminish network performance ([0039]).

It would have been obvious to further modify disclosure of Grag in view of Li with that of Templin, and thus move nodes in group block movements, in order to minimize overall node movement and maintain nodes neighbors to the greatest extent possible, thus decreasing transmission costs and improving network performance (Templin [0039]).

Garg in view of Li and Templin thus show claim 40.

40. Regarding claim 41, Garg in view of Li and Templin further show where the one or more nodes are included in one or more of the leaf blocks (Garg 3.1 – 3.1.2).

41. Regarding claim 42, Garg in view of Li and Templin further show moving the one or more nodes includes: moving the one or more nodes collectively with other ones of the one or more nodes within a same one of the leaf blocks (Li, where the leaf blocks are moved collectively to minimize messaging and transmissions costs Templin ([0039])

and to simplify calculations by maintaining nodes neighbors to the greatest extent possible (Li, Section 5.1)).

42. Claims 8 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garg in view of Li and Templin as applied to claim 1 above, and further in view of Jennings et al. (Topology Control for Efficient Information Dissemination in Ad-hoc Networks), hereafter Jennings.

Garg in view of Li and Templin show claims 1 and 21.

Garg in view of Li and Templin do not show where the selecting one of the blocks includes, or where the movement controller is configured to identify one of the blocks that includes a maximum number of nodes as the root block.

Jennings shows identifying one of the blocks that includes a maximum number of nodes (Section III).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li and Templin with that of Jennings in order to minimize node movement (Templin [0039]) which improves performance. As disclosed in claim 1, the leaf blocks rather than the root blocks are moved, and thus the larger the root block, the smaller the leaf blocks, and the less movement occurs.

43. Regarding claim 20, Garg in view of Li and Templin show claim 19.

Garg in view of Li and Templin do not show where where the means for collectively moving includes means for moving the subset of nodes in one of the blocks toward one of the nodes in another one of the blocks.

Liao shows where, when analyzing a network and considering exploiting location information to improve network performance, increasing network density and the corresponding decrease of distance between nodes can result in improved performance (pg. 23).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li and Templin with a that of Liao in order to, when making the node movements taught by Li, locate the area of the network with the average lowest distance to other nodes, as such short distances, corresponding to node density, can improve performance (Liao pg. 23).

Garg in view of Li, Templin and Liao thus show moving includes means for moving the subset of nodes in one of the blocks toward one of the nodes in another one of the blocks, as this behavior inherently increases network desnsity and thus improves network performance, as taught by Liao.

44. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garg in view of Li as applied to claim 39 above, of Liao et al. (GRID: A Fully Location-Aware Routing Protocol for Mobile Ad Hoc Networks), hereafter Liao, and Gibson et al. (US 6,362,821 B1), hereafter Gibson.

45. Regarding claim 43, Garg in view of Li show claim 39.

Garg in view of Li do not show determining the geographic center of the network and determining weighted distances for moving the one or more nodes to toward the geographic center.

Liao shows determining the geographic center of the network (Sections 3.1, pg.8; 3.3, pg. 15, pg. 6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li and Templin with a that of Liao in order to locate the area of the network with the average lowest distance to other nodes, as such short distances, corresponding to node density can improve performance (Liao pg. 23).

Garg in view of Li and Liao do not show determining the weighted distances for moving one or more nodes toward said center.

Gibson shows determining said weighted distances (Section 5, lines 1 – 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li and Laio with a that of Gibson in order to provide a route for any node to move to the center of its network, thus allowing for all nodes to move the shortest distances to improve network density and thus performance (Liao, pg. 23).

46. Regarding claim 44, Garg in view of Li, Laio and Gibson further show where the weighted distances (Gibson col. 5 lines 1 – 7) are related to distances that the nodes are from the geographic center (Liao Sections 3.1 pg .8, 3.3 pg. 15, pg 6).

47. Regarding claim 46, Garg shows a method for achieving biconnectivity in a non-biconnected network that includes a plurality of nodes (Garg 3.1, 3.2, 4.4).

Garg does not not show determining a geographic center of the non-biconnnected network and moving each one of one or more nodes a weighted distance

towards the geographic center to transform the non-biconnected network to a biconnected network.

Li shows node movement in a network, and directing said node movement in order to improve network performance (Li, Section 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

Garg in view of Li do not show determining a geographic center of the non-biconnnected network, and though they do show node movement and transforming to a biconnected network, they do not show moving a weighted distance towards the geographic center to transform the non-biconnected network to a biconnected network.

Liao shows a method of determining the geographic center of a network (Liao 2.4, 3.1-3.2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li with a that of Liao in order to locate the area of the network with the average lowest distance to other nodes, as such short distances, corresponding to node density, can improve performance (Liao pg. 23).

Garg in view of Li and Liao do show transformation to a biconnected network (Garg 3.1, 3.2, 4.4), node movement to improve network performance (Li, Section 1)

determining a geographic center of a network along with moving nodes to said geographic center corresponding to improved performance (Liao, 2.4, 3.1-3.2), but not where said movement is done according to a weighted distance.

Gibson shows determining said weighted distances (Section 5, lines 1 – 7). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li and Laio with a that of Gibson in order to provide a route for any node to move to the center of its network, thus allowing for all nodes to move the shortest distances to improve network density and thus performance (Liao, pg. 23).

48. Regarding claim 47, Garg show a network that includes a plurality of nodes, at least one of the nodes comprising a network device as well as determining the locations of the odes and achieving biconnectivity in the network (Garg 3.1, 3.2, 4.4).

Garg does not show a node movement or a movement controller.

Li show a movement controller including node movement in a network, and directing said node movement in order to improve network performance (Li, Section 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

Garg in view of Li do not show identifying a geographic center of the network based on the locations of the nodes.

Liao shows determining the geographic center of the network based on the locations of the nodes (Sections 3.1, pg.8; 3.3, pg. 15, pg. 6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li with a that of Liao in order to locate the area of the network with the average lowest distance to other nodes, as such short distances, corresponding to node density, can improve performance (Liao pg. 23).

Garg in view of Li and Liao do show transformation to a biconnected network (Garg 3.1, 3.2, 4.4), node movement to improve network performance (Li, Section 1) determining a geographic center of a network along with moving nodes to said geographic center corresponding to improved performance (Liao, 2.4, 3.1-3.2), but not where said movement is done according to a weighted distance.

Gibson shows determining said weighted distances (Section 5, lines 1 – 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li and Laio with a that of Gibson in order to provide a route for any node to move to the center of its network, thus allowing for all nodes to move the shortest distances to improve network density and thus performance (Liao, pg. 23).

49. Claims 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garg in view of Li, Liao and Gibson as applied to claim 43 above, and further in view of Proctor, Jr. et al. (5,960,047), hereafter Proctor.

Garg in view of Li, Liao and Gibson show the method of claim 43.

Garg in view of Li, Liao and Gibson do not show where the direction for a particular node of the one or more nodes includes a straight line joining a starting position of the particular node and the geographic center.

Proctor shows where a straight line is the shortest distance between two points, and thus the most efficient path (col. 3 line 65 – col. 4 line 5).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li, Liao and Gibson with that of Proctor in order for the nodes to take the fastest and most efficient path when moving.

50. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garg in view of Li, further in view of Liao.

Regarding claim 48, Garg shows a system for achieving biconnectivity in a non-biconnected network that includes a plurality of nodes, including transforming a non-biconnected network into a biconnected network (Garg 3.1, 3.2, 4.4).

Garg does not show means for causing each of one or more of the nodes to move.

Li shows means for causing each of one or more of the nodes to move, and directing said node movement in order to improve network performance (Li, Section 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices,

provides a reliable network configuration (an inherent property of biconnected networks, Mount, pg. 1).

Garg in view of Li do not show identifying a geographic center of the network based on the locations of the nodes.

Liao shows determining the geographic center of the network based on the locations of the nodes (Sections 3.1, pg.8; 3.3, pg. 15, pg. 6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li with a that of Liao in order to locate the area of the network with the average lowest distance to other nodes, as such short distances, corresponding to node density, can improve performance (Liao pg. 23).

51. Claims 50 – 52 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu (Simpler and faster biconnectivity augmentation) in view of Li.

52. Regarding claim 50, Hsu shows a method for achieving biconnectivity in a one-dimensional non-biconnected network that includes a plurality of nodes, comprising: determining initial positions of the nodes in the one-dimensional non-biconnected network (Abstract, Section 1) as well as determining this with linear programming (Sections 1 and 3).

Hsu does not show determining a movement schedule and causing one or more of the nodes to move based on the determined movement schedule.

Li shows determining a movement schedule and causing one or more of the nodes to move based on the determined movement schedule (Section 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Hsu with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks Mount, pg. 1).

53. Regarding claim 51, Hsu in view of Li further show determining the movement schedule as an objective function, converting the objective function into a linear programming representation, and solving the linear programming representation optimally in polynomial time (Hsu, Abstract, Sections 1 and 3).

54. Regarding claim 52, Hsu in view of Li further show where the linear programming representation is solved as a function of a number of nodes in the one-dimensional non-biconnected network (Hsu Section 3).

55. Regarding claim 54, Hsu shows a system for achieving biconnectivity in a one-dimensional non-biconnected network that includes a plurality of nodes, comprising: means for determining initial positions of the nodes in the one-dimensional non-biconnected network (Hsu, Abstract, Sections 1 and 3);

means for determining a biconnectivity solution optimally in polynomial time based at least in part on the initial positions of the nodes and a number of the nodes in the one-dimensional non-biconnected network (Hsu, Abstract, Sections 1 and 3, where Hsu discloses a solution in linear time, which is inherently faster than polynomial time and thus is inclusive of any polynomial time solutions).

Hsu does not show where the biconnectivity solution includes determining a movement schedule.

Li shows determining a movement schedule for nodes and causing one or more of the nodes to move based on the determined movement schedule (Section 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Hsu with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices, provides a reliable network configuration (an inherent property of biconnected networks Mount, pg. 1).

56. Claims 53 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Li as applied to claims 50 and 54 above, and further in view of Lin et al. (Adaptive Clustering for Mobile Wireless Networks), hereafter Lin.

57. Regarding claim 53, Hsu in view of Li show the method of claim 50.

Hsu in view of Li do not show where each of the nodes in the biconnected network is capable of communicating with other ones of the nodes in the biconnected network one and two hops away.

Lin shows where each of the nodes in the biconnected network is capable of communicating with other ones of the nodes in the biconnected network one and two hops away (Sections 1, 2(A)).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Hsu in view of Li with that of Lin in order to provide

for the most reliable and efficient network that allows all nodes to properly communicate.

58. Regarding claim 55, Hsu in view of Li and Lin show each of the nodes is capable of communicating with other ones of the nodes one and two hops away after biconnectivity is achieved in the one-dimensional non-biconnected network (Hsu, Sections 1-3, Lin Sections 1 and 2(A)).

(10) Response to Arguments

Applicant begins by addressing claim 1, rejected under 35 USC 103, Garg in view of Li and Templin. Applicant argues that Garg in view of Li and Templin do not disclose "collectively moving nodes in one or more of the leaf blocks to make the network biconnected." Applicant further argues that "the Examiner has not established a prima facie case of obviousness, and, in fact, the Examiner asserted that Templin teaches away from collectively moving nodes." However, as the Examiner stated in the last Office Action, no such assertion has ever been made. Applicant's argument thus is not persuasive.

Applicant states that they are interpreting Templin's teachings as teaching away "because collectively moving nodes might not minimize node movement." However, Applicant does not provide support for this assertion. Furthermore, when Applicant made similar arguments previously, further clarification for the rejection of claim 1 was provided by the Examiner, said clarification being:

> Garg was cited to show forming blocks from groups of nodes (3.1, 4.1 and 4.4). Li was cited to show moving nodes in an ad-hoc (MANET) environment to improve communication, as

well as where when nodes maintain their neighbors, calculations are simplified (Li, Sections 1, 5, and 5.1). Templin was cited to further show the desirability of minimizing node movement as node movements results in increased transmissions cost, and breaks and otherwise changes node links (Templin [39]). By continuing to utilize the blocks of nodes formed by Garg, and by moving nodes but seeking to maintain their neighbors, taught by Li, and where Templin further teaches that breaking/changing node relationships increases link costs and interrupts transmissions, collective block movements are taught. This minimizes the changes to node neighbors to the greatest extent possible, as advocated by Li (Section 5.1) and avoids interrupting communications as taught Templin ([39]) through maintaining the block structure taught by Garg. When the nodes move as a unit, node relationships are inherently maintained to the greatest extent possible. Furthermore, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant's arguments thus far have failed to address the above response, and thus Applicant's arguments remain unpersuasive for the reasons given above.

Applicant continues arguing by providing their own interpretative summaries of Li, and repeating that the argument that “Li is not concerned with whether a network is biconnected”. Furthermore, Li was not cited to teach all of "collectively moving nodes in one or more leaf blocks to make a network biconnected" as Applicant appears to argue on pg. 9. Said arguments thus remain unpersuasive for the reasons given above;

Applicant next, on page 10, addresses part of Applicant's previous response, regarding

"By continuing to utilize the blocks of nodes formed by Garg, and by moving nodes but seeking to maintain their neighbors, taught by Li, and where Templin further teaches that

breaking/changing node relationships increases link costs and interrupts transmissions, collective block movements are taught."

However, Applicant next states the "Regardless of the validity of the Examiner's statement, claim 1 recites collectively moving nodes in one or more leaf blocks to make the network biconnected, not 'collective block movements' as alleged by the Examiner."

However, as was noted in the prior Office Action, Garg in view of Li and Templin were cited to teach all of claim 1, including "collectively moving nodes in one or more leaf blocks" where the blocks described by Garg represents Applicant's claimed 'left blocks.' Applicant's above excerpt of the Examiner's argument omits and fails to address important parts of the Examiner's explanation. Furthermore, Applicant has not explained why the claimed “collectively moving nodes in one or more leaf blocks” is not properly taught/represented by the “collective node movement” described above by the Examiner. Applicant's arguments thus are not persuasive.

Applicant next argues that the Examiner's rejection was "piecemeal" and "breaks the feature down into illogical parts" and "clearly impermissible" and “clearly based solely on hindsight". However, the Examiner does not agree that that utilizing these three references, with the provided motivation to combine, as well as with additional supportive arguments, amounts to a "piecemeal examination". Furthermore, the Examiner does not agree that any of the provided explanations or interpretations of the prior art were "illogical" and the Applicant has not provided any persuasive support for this assertion. Applicant's arguments thus are not persuasive.

Applicant continues on page 11 by arguing that claims 2-7 and 9-18 depend on claim 1 and thus should be allowable for the reasons argued above. However, as

Applicant's previously addressed arguments were not persuasive, this argument is similarly unpersuasive.

Applicant next, on page 11, next addresses claim 19, arguing Garg in view of Li and Templin do not disclose "collectively moving nodes in one or more of the leaf blocks to make the network biconnected." Applicant further argues that "the Examiner has not established a prima facie case of obviousness, and, in fact, the Examiner asserted that Templin teaches away from collectively moving nodes." However, as the Examiner stated above, no such assertion has ever been made. Applicant's argument thus is not persuasive.

Applicant states that they are interpreting Templin's teachings as teaching away "because collectively moving nodes might not minimize node movement." However, as the Examiner noted above, Applicant does not provide support for this assertion.

Applicant continues on page 12 arguing that nowhere does “Templin disclose or suggest collectively moving nodes . . . as recited in claim 19”. However, Templin alone was not cited to teach collectively moving nodes; rather, Garg in view of Li and Templin were cited to teach claim 19, including "collectively moving nodes". For this reason, and for the reasons given when this argument was addressed above in relation to claim 1, Applicant’s arguments continue to be unpersuasive.

Applicant continues on page 12 by arguing that “The Examiner appears to also alledge that Li et al. discloses collectively moving nodes”. However, as noted above, Garg in view of Li and Templin are relied upon for teaching the claimed subject matter.

Applicant continues by arguing that “Li et al. discloses moving nodes to send a

message" but does not disclose "means for collectively moving a subset of nodes in more or more blocks for a number of iterations to remove the cutvertices from the network". In response to Applicant's argument, the Examiner again notes that Li alone was not relied upon to teach all of this above language, but rather Garg in view of Li and Templin were cited by the Examiner; that is, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant continues on page 13 to address claim 21, rejected under 35 USC 103, Garg in view of Li and Templin. Applicant argues that "Garg et al., Li et al., and Templin do not disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected." To support this assertion, Applicant begins by addressing Section 3.1 of Garg, arguing that "Although this section of Garg et al. discloses blocks, this section of Garg et al. does not disclose <u>moving the blocks to make the network biconnected</u>." However, Garg was not cited to teach "moving the blocks to make the network biconnected"; Garg in view of Li and Templin were cited to teach claim 21, including the above language. Li, for example, was cited specifically for teaching node movement and Garg was cited for, and discloses (as Applicant acknowledges on page 14, line 5) forming blocks. Applicant's arguments attack Garg individually when the rejection was made under 35 USC 103, Garg in view

of Li and Templin. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant next, on page 15, addresses the Li reference in relation to the rejection of claim 21. Applicant next argues that Li does not “disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected”. However, Li was not cited to teach all of this. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant continues by arguing that Li does not “disclose or suggest a movement controller....”. However, in cited Section 1 of Li, Li describes

> “asking intermediate hosts to change there trajectory in order to complete a routing path”

and that

> "a host can change its trajectory based on knowledge about other hosts trying to achieve the network connection actively . . . we explore the possibilities of changing the trajectories of the hosts in a dynamic disconnected ad-hoc network to transmit messages among hosts.”

Li continues in Section 1 to describe that their disclosure can be implemented in “a tactical robot network.” The means for the hosts to "change their trajector[ies]”

represents Applicant's claimed movement controller. Applicant's argument thus is not persuasive.

Applicant next argues that Li "is not concerned with whether a network is biconnected." However, Li was not cited to teach biconnectivity; the rejection was made under 35 USC 103, Garg in view of Li and Templin. Garg clearly show biconnectivity in Sections 3.1, 4.1 and 4.4, for example.

Applicant next, on page 15, addresses Templin. Applicant argues that Templin does not "disclose or suggest a movement controller….". However, as noted above, Li was relied upon to teach a movement controller. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant continues on page 16 to argue that "the Examiner's rejection is improper and based solely on hindsight". However, other than claiming that the Examiner "dissect[ed] claim features into a few words at a time", a statement with which the Examiner does not agree, Applicant has not provided support for the argument that the rejection was based on hindsight, and thus Applicant's argument is not persuasive.

Next, on pages 16 – 17, Applicant argues that claims 40-42, 8, 29 and 20 should be allowable, relying on the arguments addressed above. As the above arguments were not persuasive, this argument is similarly unpersuasive.

Applicant next, on page 18, argues claim 38. Applicant argues that "Nowhere in

this section, or elsewhere, does Garg disclose or suggest causing one or more of the nodes in the network to move to systematically remove the cutverticies from the network and form a biconnected network". In response to this argument against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant continues by addressing Li, arguing that "Nowhere in this section, or elsewhere, does Li disclose or suggest causing one or more of the nodes in the network to move to systematically remove the cutverticies from the network and form a biconnected network." However, Li was not cited to teach all of this, and thus Applicant's argument is not persuasive. As was noted above, claim 38 was rejected under 35 USC 103, Garg in view of Li. In response to this argument against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant next argues that "Li is not concerned with whether a node is biconnected." However, as Li was not cited to teach biconnectivity, Applicant's argument is not persuasive.

Applicant next argues Garg, stating that Garg "discloses finding minimum 2-edge connected and 2-vertex connected subgraphs in a given graph." Applicant continues by

arguing that "Finding minimum 2-edge connected and 2-vertext connected subgraphs is in now way equivalent to systematically removing cutvertices from a network and forming a biconnected network." However, as the Examiner noted in the previous action, the "removing the cutverticies from the network to form a biconnected network" claim language is clearly shown by Garg. The title of Garg, "Improved Approximation Algorithms for Biconnected Subgraphs . . ." alludes to this. Specific support can be found starting on the first line in the Abstract, which states "We consider the problems of finding minimum 2-edge connected and 2-vertex connected subgraphs in a given graph". Said "2-edge connected and 2-vertex connected" is simply another way of referring to biconnectivity, and refer to the properties that define biconnectivity. Applicant addresses this statement by the Examiner, but then states "Regardless of the validity of the Examiner's statement, Garg et al. does not disclose systematically removing cutvertices from a network and forming a biconnected network."

However, Garg in view of Li clearly do show this claim language, as was explained in the prior rejection and is explained above. As was noted in the previous action, Garg in Section 2, discusses "The problems of 2EC and 2VC (that is, 2-edge-conencted and 2-vertex-connected, which, as noted above, is simply another term for biconnectivity) can be posed for weighted graphs as well". Section 3, the following section, is then focused on utilizing "graph carvings" to improve on the biconnectivity solutions of Section 2. Finally, more details regarding the "removing the cutverticies from the network to form a biconnected network" can be found in section 3.1, which discusses "partition of vertices into blocks", then works removing the cut vertices

("check if u, the parent of v in T, threatens to be a cut vertex"). Also, as was noted in the previous and is noted in the present Office Action, biconnected graphs are defined by a lack of cut vertices, and thus making a graph biconnected inherently results in the removal of cut vertices. Garg, as shown above, thus utilizes the term "graph carvings" to discuss the removal of cutvertices. Applicant's arguments thus are not persuasive.

Applicant next, on page 20-21, argues claim 39. Applicant argues that Garg in view of Li do not show "moving one or more nodes in the determined direction and distance to transform a non-biconnected graph network to a biconnected network". However, in the previous rejection, Li was cited in the following manner:

Li shows identifying one or more of the nodes to move (Li, Section 1); determining direction and distance to move the one or more nodes; and moving the one or more nodes in the determined direction and distance (where Li shows changing a nodes trajectory (Section 1) along with how a node move and where a node moves to (Section 3.2), thus inherently showing 'a determined direction and distance').

Li additionally shows node movement in Section 1 by stating "asking intermediate hosts to change their trajectory" and "a host can change its trajectory."

Regarding reasons for combining Garg with Li, the Examiner stated in the previous action:

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg with that of Li in order to provide for a method for the semi-autonomous robotic nodes of Li's disclosure to efficiently orient and network themselves in a biconnected network, which, due to the lack of cutvertices,

provides a reliable network configuration (an inherent property of biconnected networks, see Mount, pg. 1).

Applicant has not addressed the provided reasons for combination, and thus for this reason and the reasons given above, Applicant's arguments are not persuasive.

On page 22 Applicant addresses claim 49. Applicant argues that Garg in view of Li do not disclose claim 49. Specifically, Applicant argues that Garg does not "disclose or suggest determining a direction and distance to move one or more nodes, let alone moving one or more nodes in the determined direction and distance to transform and non-biconnected network to a biconnected network" and that Garg "does not disclose moving nodes at all."

However, Garg was not cited to teach node movement; as the Examiner noted above and in the pending rejection, Li was explicitly cited to teach node movement (Section 1). Applicant's arguments that Garg does not "disclose moving nodes at all" thus are not persuasive.

On page 24, Applicant addresses claims 43 and 44. Addressing claim 43 specifically, Applicant argues, regarding the Liao reference, that they "find absolutely no disclosure similar to determining a geographic center of a network as direction to move one or more nodes". Liao, however, was not cited to teach all of the above, but rather cited to teach "determining the geographic center of the network". For example, in section 3.1, page 8, Liao states

> "we also suggest that they gateway host of a grid should be the one nearest the physical center of the grid"

Liao continues on page 13 describing comparing/utilizing information regarding how

close various hosts are to the physical center, stating

> “when a host assumes itself as the gateway hears the GATE packet from another location closer to the physical center of its grid….”

Pages 2-3 and page 6 further describes nodes utilizing their physical locations, as well as using GPS technology to determine location.

Liao thus teaches determining the geographic center of a network. Liao further teaches on page 23-24 utilizing location information (to improve routing by increasing node density).

Applicant’s arguments thus are not persuasive.

Applicant next argues Gibson, arguing that "just because this section of Gibson et al uses the words 'node,' 'weighted,' and 'distance' does not mean that this section of Gibson et al. discloses determining a weighted distance for moving one or more nodes toward a geographic center. However, Gibson was not cited to teach all of "determining a weighted distance for moving one or more nodes toward a geographic center". Furthermore, Gibson clearly teaches moving nodes a weighted distance. The cited section of Gibson, col. 5 lines 1 - 7, states that "a first relaxation step moves each node a distance determined by taking an average (weighted by distance) . . .". Applicant assertion that this passage does not teach weighted distances is not persuasive.

Applicant next argues that Gibson is "related to generating a surface model for a three-dimension object" and "has nothing to do with communication networks" and thus "there could be no reasonable explanation as to why one of ordinary skill in the art" would use "any feature of Gibson". However, as was noted by the Examiner in the previous Office Action:

Gibson was not cited to teach communication networks, merely the concept of a node moving a weighting distance. Applicant also argues "there could be no reasonable explanation" to utilize Gibson's disclosure. However, a clear reason, unaddressed by Applicant, was provided in the previous office action:

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Garg in view of Li and Laio with a that of Gibson in order to provide a route for any node to move to the center of its network, thus allowing for all nodes to move the shortest distances to improve network density and thus performance (Liao, pg. 23).

Applicant's argument does not address the supplied motivation statement and thus is not persuasive. Applicant's argument that "the Examiner has not established a prima facie case of obviousness" is similarly unpersuasive, as a clear motivation statement was provided, which the Applicant has not addressed.

On page 26-27, Applicant begins arguing claim 46. Applicant begins by again arguing that Garg in view of Li, Liao and Gibson “do not disclose or suggest determining a geographic center of the non-biconnected network; and moving each of the one or more nodes a weighted distance towards the geographic center to transform the non-biconnected network to a biconnected network”.

Continuing on page 27, Applicant next proceeds to attack the Li, Liao and then Gibson references individually; one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.

See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant continues on page 28 to argue Gibson regarding teaching "weighted distance", repeating the arguments addressed above in relation to claims 43 and 44. Applicants argument continues to be unpersuasive for the reasons given above.

On page 29, Applicant argues claim 47. Applicant again argues that Liao "simply discloses selecting a gateway host of a grid as the one nearest to the physical center of the grid." However, Liao was cited to teach "determining the geographic center of the network". The "physical center" Applicant acknowledges is taught by Liao represented Applicant's claimed "geographic center". One cannot determine the node/host closest to the physical/geographic center of a network without knowing what said physical/geographic center is. Applicant's argument regarding Liao thus is not persuasive.

Applicant's arguments continue through page 30; said arguments have been addressed above in relation to claims 43, 44 and 46. Applicant's arguments continue to be unpersuasive for the reasons give above.

Applicant next argues that claim 45 should be allowable based on arguments given above relating to claim 43. Applicant's argument is not persuasive for the reasons given regarding claim 43.

Applicant continues the above arguments, on page 31, in relation to claim 48. Said arguments continue to be unpersuasive for the reasons give above.

On page 32, Applicant continues addressing claim 48, arguing that "Assuming,

for the sake of argument, that the blocks of Garg et al. can be construed as corresponding to the nodes of claim 48 . . . Garg et al does not disclose or suggest moving the blocks." However, as the Examiner has noted above, Garg was not cited to teach node movement, Li was. Applicant's arguments regarding Garg and node movement thus are not persuasive.

On page 33, Applicant continues by arguing Li and then Liao, attacking the references individually; however, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant continues on page 33 arguing that they "object strenuously to the Examiner's piecemeal examination" and that it is "wholly unreasonable for the Examiner to dissect a claim feature into a few words at a time and cite to unrelated sections of different references". However, the Examiner strongly disagrees that the references cited are "unrelated" nor does the Examiner agree that the examination was "piecemeal". Furthermore, the Examiner does not agree that the Applicant has persuasively argued that this is the case. Applicant's arguments are not persuasive.

On page 34, Applicant argues that claim 50 is not taught by the cited art, Hsu in view of Li, and that the cited art "do not disclose or suggest the combination of features in claim 50" and that they "object to the Examiner's piecemeal examination".

To support these assertions, Applicant argues on page 35 that Hsu does not "disclose or suggest determining a movement schedule". However, the rejection of

claim 50 clearly states that "Hsu does not show determining a movement schedule" and thus cites Li to teach this element, as part of the rejection made under 35 USC 103. Applicant's argument thus is not persuasive.

Applicant continues on page 35 arguing that Li "does not disclose determining a movement schedule" and that Li "does not disclose or suggest determining a movement schedule for nodes using one or more linear programming techniques". However, Hsu was cited for teaching "liner programming techniques", and thus Applicant's argument is not persuasive. Li does teach "determining a movement schedule" in Section 1. For example, in cited Section 1 of Li, Li teaches the claimed "movement schedule" through the disclosure

> "asking intermediate hosts to change there trajectory in order to complete a routing path"

and that

> "a host can change its trajectory based on knowledge about other hosts trying to achieve the network connection actively . . . we explore the possibilities of changing the trajectories of the hosts in a dynamic disconnected ad-hoc network to transmit messages among hosts."

Applicant's arguments thus are not persuasive.

Applicant continues by arguing that claims 51 and 52 should be allowable as they depend on claim 50. Said argument is not persuasive as the arguments relating to claim 50 were not persuasive.

Applicant next, on pages 35 – 36, addresses claim 54. After summarizing their own interpretative summary of the subject mater of claim 54, Applicant again argues that Hsu does not "disclose or suggest determining a movement schedule". However, as noted by the Examiner above regarding claim 50, Hsu was not cited to teach this, Li

was. As the Examiner noted in the pending rejection of claim 54, Hsu discloses a system for achieving biconnectivity that is inclusive of a polynomial time solution; Hsu however does not show where said solution includes a movement schedule as Hsu does not explicitly teach node movement. Li was specifically cited to teach said node movement and movement schedule.

Applicant's arguments against Li and Hsu merely attack the references individually, and do not address the specific features Li and Hsu were cited to teach; one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant continues on page 38, arguing that claims 53 and 54 should be allowable as they depend on claims 50 and 54. Said arguments are not persuasive as the arguments relating to claims 50 and 54 were not persuasive.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/J. M./
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Examiner, Art Unit 2442

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